

REMARKS

Applicants respectfully request that the foregoing amendments be entered at least because they raise no new issues that would require further search or consideration.

Claims 2 and 36 are being cancelled without prejudice or disclaimer. Claims 1, 5-7, 13, 19, 28-30, 32, 33 and 35 are currently being amended. Beyond the amendments discussed below, Applicants have amended the phrase "at least one of combustion gas and exhaust gas" to be at least one of combustion gas or exhaust gas to be clear that the claim covers combustion gas, exhaust gas, or both.

This amendment changes and deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Of the claims not withdrawn from consideration, claims 1, 5, 6 and 15-35 are now pending in this application. (Claims 7-10 and 12 - 14 stand withdrawn from consideration.)

Drawings

Applicants submit herewith formal drawings with the approved changes of the amended drawings filed on January 3, 2002, as requested in the Office Action.

Allowable subject matter

Applicants appreciate the indication that claims 19-22 are allowed and that claims 5, 15, 16 and 34 would be allowable if rewritten in independent form. Applicants have not amended dependent claims 5, 15, 16 and 34 at this time, because for the reasons given below, applicants believe that the independent claims from which these dependent claims depend, are allowable. In addition, the remarks below are only made as to rejected claims, and not any allowable/allowed claims.

Rejections under 35 U.S.C. § 103

Claims 1, 2, 18, 23-30, 32, 33, 35 and 36 stand rejected under 35 U.S.C. 103(a) as being unpatentable over WO 00/53903 to Twigg (hereafter "Twigg"). Claims 6, 17 and 31

stand rejected under 35 U.S.C. 103(a) as being unpatentable over Twigg in view of U.S. Patent No. 5,124,303 to Kobayashi et al. (hereafter “Kobayashi”) and U.S. Patent No. 4,149,998 to Tauster et al. (hereafter “Tauster”). Applicants respectfully traverse these rejections, insofar as they pertain to the claims as presently amended, for at least the following reasons.

Claim 1 is directed to an exhaust gas purifying system comprising a NO_x treating catalyst, and a hydrogen enriching device arranged to increase a ratio of hydrogen to total reducing components in at least one of combustion gas or exhaust gas. The system of claim 1 includes the following features: (1) “wherein said hydrogen enriching device includes a catalyst containing at least one of a first catalytic component including platinum and zirconium oxide and a second catalytic component including rhodium and zirconium oxide, and a combustion control device for controlling at least one selected from the group consisting of operating parameters of an internal combustion engine and combinations of the operating parameters, the operating parameters including fuel injection amount, fuel injection timing, spark timing, opening and closing timings of intake and exhaust valves of the internal combustion engine, to control at least one of combustion gas or exhaust gas flowing into the catalyst”, and (2) “wherein said hydrogen enriching device is arranged to increase a ratio of hydrogen to carbon monoxide in the total reducing components in exhaust gas so as to meet a relation represented by the following formula $[H_2 / CO]_d > 1$ where $[H_2 / CO]_d$ is a ratio between a concentration $[H_2]_d$ of hydrogen and a concentration $[CO]_d$ of carbon monoxide in the total reducing components in exhaust gas in the exhaust gas passageway immediately upstream of the NO_x treating catalyst and downstream of said hydrogen enriching device, when reduction of NO_x is carried out by said NO_x treating catalyst.” The features (1) and (2) in combination beneficially reduce the concentration of CO in exhaust gas.

With respect to feature (2), it reduces the influence of CO as a reducing component that impedes the reaction between H₂ and NO_x. Thereby, the reactivity of H₂, which has a high reducing action with NO_x, is remarkably enhanced, thus further improving NO_x reduction efficiency. This advantage is discussed in the specification at page 15, first paragraph. When the concentration by CO in exhaust gas is reduced as in feature (2), CO is

not easily absorbed at the surface of the catalytic component even under low exhaust temperatures, such as below 200 °C. Thus, catalyst poisoning of CO can be avoided. As a result H₂ is more easily attached to the surface of the catalytic component, thus enhancing the reaction between H₂ and NO_x.

In addition, feature (1) further enhances the effect of feature (2). Specifically, the catalyst containing at least one of the first component and the second component contributes to reducing the concentration of CO in exhaust gas. The combination of the catalyst containing the catalytic component as recited, and the combustion control device for increasing the H₂ concentration, allow the concentration of CO in exhaust gas to be effectively reduced.

By contrast, neither Twigg nor the remaining references cited in the rejection of the claims suggest the combination of features (1) and (2) as recited in claim 1, or the significant advantages gained by this combination.

Independent claims 28, 29, 30, 33 and 35 include features analogous to (1) and (2) in claim 1. Thus for reasons analogous to those for claim 1, independent claims 28, 29, 30, 33 and 35 are likewise patentable over Twigg, Kobayashi and Tauster.

The rejected dependent claims under consideration depend from one of independent claims 1, 30, 33 or 35, and are thus likewise allowable for at least this reason.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date June 29, 2004

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Atty. Dkt. No. 040679-1154

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Shinji YAMAMOTO et al.
Title: EXHAUST GAS PURIFYING SYSTEM
Appl. No.: 09/692,470
Filing Date: 10/20/2000
Examiner: T. Nguyen
Art Unit: 3748

AMENDMENT TRANSMITTAL

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith is an amendment in the above-identified application.

☐ Small Entity status under 37 C.F.R. § 1.9 and § 1.27 has been established by a previous assertion of Small Entity status.

☐ Assertion of Small Entity status is enclosed.

☒ The fee required for additional claims is calculated below:

	Claims As Amended		Previously Paid For		Extra Claims Present		Rate		Additional Claims Fee
Total Claims:	31	-	34	=	0	x	\$18.00	=	\$0.00
Independent Claims:	9	-	9	=	0	x	\$86.00	=	\$0.00
First presentation of any Multiple Dependent Claims:							+	\$290.00	= \$0.00
CLAIMS FEE TOTAL									= \$0.00

☒ Applicant hereby petitions for an extension of time under 37 C.F.R. §1.136(a) for the total number of months checked below:

<input type="checkbox"/>	Extension for response filed within the first month:	\$110.00	\$0.00
<input checked="" type="checkbox"/>	Extension for response filed within the second month:	\$420.00	\$420.00
<input type="checkbox"/>	Extension for response filed within the third month:	\$950.00	\$0.00
<input type="checkbox"/>	Extension for response filed within the fourth month:	\$1,480.00	\$0.00
<input type="checkbox"/>	Extension for response filed within the fifth month:	\$2,010.00	\$0.00
EXTENSION FEE TOTAL:			\$420.00
<input type="checkbox"/>	Statutory Disclaimer Fee under 37 C.F.R. 1.20(d):	\$110.00	\$0.00
CLAIMS, EXTENSION AND DISCLAIMER FEE TOTAL:			\$420.00
<input type="checkbox"/>	Small Entity Fees Apply (subtract ½ of above):		\$0.00
TOTAL FEE:			\$420.00

☐ Please charge Deposit Account No. 19-0741 in the amount of \$0.00. A duplicate copy of this transmittal is enclosed.

☒ A check in the amount of \$420.00 is enclosed.

☒ The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Please direct all correspondence to the undersigned attorney or agent at the address indicated below.

Respectfully submitted,

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